

1. A contactor comprising:

a first substrate;

a plurality of first electrodes arranged on one surface of the first substrate;

a plurality of probe terminals respectively provided on the first electrodes and making electrical contact with each of a plurality of checking electrodes of an object to be checked, the respective probe terminal having at least one conductive support mounted upright on the respective first electrode with a predetermined aspect ratio, a conductive elastic support plate whose one end is fixed to an end of the conductive support which is opposite to the first electrode, and a contact terminal provided on the other end of the elastic conductive support plate;

a plurality of second electrodes arranged on the other surface of the first substrate;

a first connection line electrically connecting, in the first substrate, each of the first electrodes to each of the second electrodes; and

elastic electrical connection means connecting the respective second electrode to a testing apparatus.

2. A contactor according to claim 1, wherein an aspect ratio of the conductive support is 2 to 20.

3. A contactor according to claim 1, wherein the conductive support is comprised of a structure of a triangular prism.

4. A contactor according to claim 1, wherein the elastic support plate has two plates arranged in a spaced-apart way and a connection plate connecting together one-end sides of these two plates, those free end portions of the two plates of the elastic support plate which are not connected by the connection plate are fixed to the conductive supports, and a

contact terminal is provided at a substantially middle of the connection plate of the elastic support plate.

5. A contactor according to claim 1, wherein the elastic support plate has a substantially square frame-like plate and a bridge-like plate provided on a diagonal line of the square frame-like plate, the frame-like plate is fixed to the conductive support at corners of the diagonal line, and the contact terminal is provided at a substantially middle of the bridge-like plate.

6. A contactor according to claim 1, wherein the elastic support plate has a substantially square frame-like plate and two cantilever-like beams extending from two corners on a diagonal line of the frame and having free ends facing each other in a spaced-apart way, the frame-like plate is fixed to the conductive supports at the corners of the diagonal line, and two contact terminals are provided such that the free ends of the cantilever-like beams are arranged opposite to each other with a spacing provided.

7. A contactor according to claim 1, wherein the electrical connection means connecting each of the second electrodes to a testing apparatus has a second substrate, and third electrodes provided on one surface of the second substrate and elastically and electrically contacted with the second electrodes.

8. A contactor according to claim 7, wherein the second substrate is comprised of a printed wiring board.

9. A contactor according to claim 1, wherein the plurality of first electrodes are arranged at a central area of one surface of the first substrate.

10. A contactor according to claim 1, wherein the plurality of first electrodes are so provided as to correspond to all of a plurality of checking electrodes of the object to be checked.

11. A contactor according to claim 1, wherein the plurality of second electrodes are arranged at a peripheral area on the other surface of the first substrate.

12. A contactor according to claim 1, wherein the contact terminal is comprised of a bump having a flat surface at a forward end and gradually increased in thickness from the forward end toward a base section.

13. A contactor according to claim 12, wherein the probe terminal is cylindrical in configuration.

14. A contactor comprising:

a first substrate;

a plurality of first electrodes arranged on one surface of the first substrate;

a plurality of probe terminals respectively provided on the first electrodes and making electrical contact with each of a plurality of checking electrodes of an object to be checked, the probe terminal having at least one conductive support mounted upright on the respective first electrode with a predetermined aspect ratio, a conductive elastic support plate whose one end is fixed to an end of the conductive support which is opposite to the first electrode, and a contact terminal provided on the other end of the conductive elastic support plate;

a latching member provided on the first substrate to restrict an access distance of the elastic support plate to the first substrate side;

a plurality of second electrodes arranged on the other surface of the first substrate;

a first connection line electrically connecting, in the first substrate, each of the first electrodes to each of the second electrodes; and

elastic electrical connection means connecting each of the second electrodes to a testing apparatus.

15. A contactor according to claim 14, wherein the aspect ratio of the conductive support is 2 to 20.

16. A contactor according to claim 14, wherein the elastic support plate has two plates arranged in a spaced-apart way and a connection plate connecting together one end sides of these two plates, free ends of the two plates of the elastic support plate not connected by the connection plate are fixed to the conductive support, and the contact terminal is provided at a substantially middle of the connection plate of the elastic support plate.

17. A contactor according to claim 14, wherein the elastic support plate has a substantially square frame-like plate and a bridge-like plate provided on a diagonal line of the frame, the frame-like plate is fixed to the conductive supports at corners of the diagonal line, and the contact terminal is provided at a substantially middle of the bridge-like plate.

18. A contactor according to claim 14, wherein the elastic support plate has a substantially square frame-like plate and two cantilever-like beams extending from two corners on the diagonal line of the frame onto the diagonal line and having free ends arranged opposite to each other with a clearance provided, the frame-like plate is fixed to the conductive supports at corners on the diagonal line, and the two contact terminals are provided at respective free ends of the cantilever-like beams in a mutually opposite way with a spacing provided.

19. A contactor according to claim 14, wherein electrical connection means connecting each of the second electrodes to a testing apparatus has a second substrate and third electrodes provided on one surface of the second substrate and having elastic connection members elastically and electrically contacted with the second electrodes.

20. A method for manufacturing a contactor as recited in claim 1 with the use of a processing technique of coating a resist film on a predetermined surface, exposing the resist film with light, etching an exposed portion of the resist film

to form an opening in the resist film, and performing a predetermined process on the opening, comprising:

- the step of forming a plurality of said first electrodes on a first substrate;
- the step of forming the conductive support on each of the first electrodes, as a resist in the step of forming the conductive support use being made of a transparent resist material so as to form the conductive support of a predetermined aspect ratio;
- the step of forming the conductive elastic support plate whose one end is fixed to an end opposite to the first electrode side of each of the conductive supports; and
- the step of forming the contact terminal on the other end of the elastic support plate.

21. A method for manufacturing a contactor as recited in claim 14 with the use of a processing technique of coating a resist film on a predetermined surface, exposing the resist film with light, etching an exposed portion of the resist film to form an opening and performing a predetermined process on the opening, comprising:

- the step of forming a plurality of said first electrodes on the first substrate;
- the step of forming the conductive support and latching member on each of said first electrodes, as a resist material in the step of forming the conductive support and latching member use being made of a transparent resist material so as to form the conductive support of a predetermined aspect ratio;
- the step of forming the conductive elastic support plate whose one end is fixed to an end opposite to the first electrode side of each of the conductive supports; and
- the step of forming the contact terminal on the other end of the elastic support plate.

22. A method of forming a cantilever probe contactor, the method comprising:
successively patterning a first and second sacrificial layer of resist over a substrate,
each layer of resist having an opening;
depositing a first conductive material after patterning the first sacrificial layer,
depositing a second conductive material after patterning the second sacrificial layer to
form a cantilever element having:
a first portion formed in an opening in the first sacrificial layer, and
a second portion comprising a support element coupled to the first portion and
formed in an opening in the second sacrificial layer;
and
removing the first and second sacrificial layers simultaneously.

23. A method of forming a cantilever probe contactor, the method comprising:
successively patterning a first and second sacrificial layer of resist over a substrate,
each layer of resist having an opening;
depositing a first conductive material after patterning the first sacrificial layer;
depositing a second conductive material after patterning the second sacrificial layer to
form a cantilever element having:
a first portion formed in an opening in the first sacrificial layer,
a second portion comprising a support element coupled to the first portion and
formed in an opening in the second sacrificial layer, and

a third portion comprising a contact element coupled to the first portion, at least a part of the third portion being formed in the substrate;

and

removing the first and second sacrificial layers simultaneously,

wherein the contact element is formed of a conductive material in a predetermined opening formed in the substrate.

24. The method of claim 23, wherein the substrate is a silicon substrate.

25. The method of claim 22, wherein the conductive material includes at least nickel.